



# CTN Test Report

## 92-013

AFTB-ID  
92-037



## Engineering Drawing Transfer Using



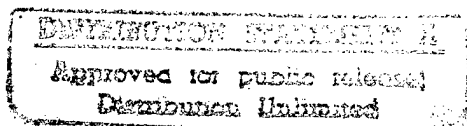
## Sundstrand Aerospace



## MIL-D-28000A (IGES)



## Quick Short Test Report



10 November 1992

19960822 224



Prepared for  
Air Force Materiel Command

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CTN Test Report  
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AFTB-ID-92-37

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Engineering Drawing Transfer  
Using Sundstrand Aerospace  
MIL-D-28000A (IGES)

Quick Short Test Report

10 November 1992

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## **1. Introduction**

### **1.1 Background**

The DoD Computer-aided Acquisition and Logistics Support (CALS) Test Network (CTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The CTN is a DoD-sponsored confederation of voluntary participants from industry and government managed by the Air Force Materiel Command.

The primary objective of the CTN is to evaluate the effectiveness of the CALS Standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards, formal and informal. Formal tests are large, comprehensive tests that follow a written test plan, require specific authorization from DoD, and may take months to prepare, execute, and report.

Informal tests are used by the CTN technical staff to broaden the testing base by including representative samples of the many systems and applications used by CTN participants. They also allow the CTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and to respond, in a timely manner, to the many requests for help that come from participants. Participants take part voluntarily and are benefited by receiving an evaluation of their latest implementation (interpretation) of the standards, interacting with the CTN technical staff, gaining experience in use of the standards, and developing increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

### **1.2 Purpose**

The purpose of the informal test reported in this QSTR was to analyze Sundstrand Aerospace's interpretation and use of the CALS Standards in transferring engineering drawing data. Sundstrand used its CALS Technical Data Interchange System to produce data in accordance with the standards and delivered it to the CTN technical staff on a 9-track magnetic tape.

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## 2. Test Parameters

Test Plan: AFTB 92-37

Date of  
Evaluation: 8 July 1992

Evaluator: George Elwood  
Air Force CALS Test Bed  
HQ AFMC/ENCT  
Suite 200  
4027 Col Glenn Hwy  
Dayton OH 45431

Data  
Originator: Richard White  
Sundstrand Aerospace  
4747 Harrison Avenue  
PO Box 7002  
Rockford IL 61125-7002

Data  
Description: Technical Manual Test  
1 document declaration file  
1 IGES file

Data  
Source System:

IGES

**HARDWARE**

Unknown

**SOFTWARE**

Unigraphics II v8.0

Evaluation  
Tools Used:

**MIL-STD-1840A (TAPE)**

SUN 3/280

CTN Tapetools (v1.2.8) UNIX

Agfa Compugraphics CAPS/CALS v40.4

Cheetah Gold 486

CTN Tapetools (v1.2.8) DOS

**MIL-D-28000 (IGES)**

SUN 3/60

Rosetta Technologies Preview V3.2

IGES Data Analysis IGESView V2.0

IDA IGES Parser/Verifier

Sun SparcStation 2

International TechneGroup Incorporated

IGES/Works

Rosetta Technologies Preview V3.2

ArborText iges2draw

Cheetah Gold 486

AutoCAD 386 R11

CADKEY V4.06

IDA IGES Parser/Verifier

Rosetta Technologies Preview V3.2

Standards  
Tested:

MIL-STD-1840A

MIL-D-28000A

### **3. 1840A Analysis**

#### **3.1 External Packaging**

The tape arrived at the Air Force Test Bed enclosed in a box IAW ASTM D 3951. The exterior of the box was not marked with the required magnetic tape warning label, MIL-STD-1840A, para. 5.3.1.3.

The tape was not enclosed in a barrier bag or barrier sheet material as required by MIL-STD-1840A, para. 5.3.1.2. Inspection of the tape reel showed a lack of the required label indicating the recording density as required by MIL-STD-1840A, para. 5.3.1. Some 9-track tape units require this BPI to be set manually. Enclosed in the box was a packing list showing all files that were recorded on the tape.

#### **3.2 Transmission Envelope**

The 9-track tape received by the Air Force Test Bed contained MIL-STD-1840A files. The files were named per the standard conventions.

##### **3.2.1 Tape Formats**

The 1840A Tape was run through the AFTB *TAPETOOL* utility version 1.2.8. No errors were encountered while evaluating the contents of the tape labels. The tape was also read using Agfa CAPS *read1840A* utility. No errors were reported during this operation.

##### **3.2.2 Declaration and Header Fields**

No errors were reported during the evaluation of the declaration file and data file headers.

### **4. IGES Analysis**

The tape contained one large IGES file. The transmittal letter did not specify the CALS Class of the file. The initial parsing of the file was against CALS Class I with a resulting large number of errors. When the file was viewed using a CAD system in the AFCTB, it was noted that the file was a Class II drawing and model. The parsing was reaccomplish testing against CALS Class



II specifications. It was also noted that the required CALS statement in the Start section was missing, MIL-D-28000A, para. 3.2.2.4.1

The first reported errors relate to the global line thickness. The global parameter indicates no thickness which is not permitted, MIL-D-28000A, para.3.2.2.4.2. Shown below are the error messages and the global section from the file.

```
* Maximum line thickness.= 0.000000E+000
ERROR 3009: CALS Class II does not allow maximum thickness to be defaulted.
WARNING 1082: Maximum line thickness specified is zero.
Minimum line thickness = 0.000000E+000
CAUTION 1081: Maximum line thickness equal to minimum thickness.
Granularity = 1.000000E-008
* Maximum coordinate = 0.000000E+000
ERROR 3008: CALS Class II does not allow maximum coordinate to be defaulted.
CAUTION 1080: Maximum coordinate value in data is to be zero.
```

```
1H,,1H;,36Hparis:[native.dd.t-47]test_inlet.prt,14Htest_inlet.igs,37HUniG 1
graphics II on VAX/VMS Version 8.0,21HUGII/IGES version 8.0,32,38,16,38,G 2
16,24HSundstrand Power Systems,1.0,2,2HMM,3,,13H920623.092354,0.1D-7,, G 3
Aerospace,6,0; G ^line thickness 14HBruce J. Brown,2
4
```

The next CALS error was reported on line D5677. The error was an illegal form used for CALS Class II. This error was correct for MIL-D-28000 but MIL-D-28000A, Table II does permit this form (7) to be used. This was the last reported CALS error in the file.

\*\*\* Entity type: 402

ERROR 4042: Illegal form for CALS Class II specified at D 5677.

402	9596		1	1	6161	0	1D	5677
402	2	0	1	7		TEMP_DL_	0D	5678

^^^ Form Number

Although no more CALS related errors were reported, several basic IGES errors were noted during the parsing/verifying operation. These errors are addressed in the area below.

\*\*\* Entity type: 108

ERROR 2012: Bounded Plane defined at D 5805 without a boundary specified.

108	9660		1	1	0	0	1010001D	5805
108	2	0	2	1			0D	5806

108,1.0,0.0D0,0.0D0,-145.524375,0,-145.524375,56.7205706543874, 5805P 9660  
 \*\*\* Must not be zero IGES Specification 4.0, para. 3.6

\*\*\* Entity type: 212

ERROR 2279: Text box width is negative or zero at D 4477.  
 ERROR 2278: Text box height is negative or zero at D 4477.

212	6611		1	1	5955	0	101D	4477
212	2	5	1	0			0D	4478

212,1,0,0.0,0.0,1,0.0,0.0,0,0,0.0,0.0,0.0,,0,0;  
 \*\*\* Box height must not be zero  
 \*\*\* Box width must not be zero

The file was converted using all available CAD systems in the AFCTB with varying results. The Air Force CALS Test Bed imported the provided IGES file and displayed it without performing additional operations. This may, at times, not reflect the complete capability of a CAD package. It does show the initial condition of the file after conversion and the amount of work necessary to make the file usable in the CAD system. This file points out problems with receiving drawings or views and models. Different CAD systems handle these entities in different ways.

AutoCAD R11 translated the file with many reported errors. No error log is generated during this process. The reported errors were nonsupported entities. When displayed on the screen, AutoCAD displayed the basic information sheet and placed the model in the lower left corner of the screen. The image appeared to be missing many lines. A hard copy of the complete drawing and detail of the part are included in the appendix to this report.

The file was then converted using Cadkey v4.06. The conversion was completed without reported error. When the drawing was displayed, the included models were displayed around the screen. Various parts of the models were also displayed around the screen. Several of the models were displayed in the lower left corner of the screen. When this area was exploded, the multiple views could be seen. Hard copies are included in the appendix to this report.

The file was converted using the ArborText Adept iges2draw software utility. No errors were reported during this procedure. The image displayed with two models displayed. The text on the left side and lower right corner of the sheet extended over the

dress lines on the sheet. A hard copy of the display is included in the appendix to this report.

The file was converted using IDA's *IGESView*. No errors were reported and the file was displayed without problem. Multiple drawings were noted and all were displayed and several were printed. Drawing one was similar to that output by Adept's *iges2draw* software utility. The same overflow of text and dress lines were noted. Drawing two is a cross section of the part. Drawing three is the basic drawing sheet graphics. View Sheet P/L is the basic part list line graphics. Front, top, and side views were also present and were displayed. Note, more effort was made to view all possible views and drawings using this product.

ITI's *IGESWorks* was next used during the evaluation. The resulting image was like the *AutoCAD R11* output. A hard copy is included in the appendix to the report.

Rosetta Technologies's *Prepare* was used on three different platforms. The SUN 3 and SUN SPARC version would not convert the file. Both systems did a core dump while processing the file. The PC version of the software completed the conversion without reported errors. During the conversion it was noted that the file contained twenty views and seven drawings. Drawing one was similar to the Adept output. Drawing two was a cross section of the model in the center of the layout sheet. The remaining models when displayed only showed the layout board and change block displayed in the left corner. The drawing generated similar displays to *IGESView*.

## 5. SGML Analysis

No SGML files were included on this tape.

## 6. Raster Analysis

No raster files were included on this tape.

## 7. CGM Analysis

No CGM files were included on this tape.

## 8. Conclusions and Recommendations

In summary, the MIL-STD-1840A tape structure from Sundstrand Aerospace was correct. No errors were reported by any of the three tape utilities used in the AFCTB.

The included IGES file did not meet current CALS MIL-D-28000A Standards. The required CALS information in the Start section was missing. The defined line thickness was incorrect. The other reported CALS error is not an error with the newly released MIL-D28000A. Several other basic IGES errors were also reported.

Because of the two minor reported IGES errors, this tape did not meet current CALS Standards.

---

## 9. Appendix A - Tape Tool Report Logs

### 9.1 Tape Catalog

CALS Test Network Catalog Evaluation - Version 1.2; Release Number 8

Standards referenced:

MIL-STD-1840A (1987) - Automated Interchange of Technical Information

ANSI X3.27 (1987) - File Structure and Labelling of Magnetic Tapes  
for Information Interchange

ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Tue Jul 07 14:49:18 1992

MIL-STD-1840A File Catalog

File Set Directory: C:\TAPETOOL\SET004

Page: 1

File Name	File Type	Record Format/ Length	Block Length/Total	Selected/ Extracted
D001	Document Declaration	D/00260	02048/000001	Extracted
D001Q001	IGES	F/00080	02000/000648	Extracted

Catalog Process terminated normally.

---

## 9.2 Tape Evaluation Log

ALS Test Network Tape Evaluation - Version 1.2; Release Number 8

Standards referenced:

ANSI X3.27 (1987) - File Structure and Labelling of Magnetic Tapes  
for Information Interchange

ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Tue Jul 07 14:48:36 1992

ANSI Tape Import Log

Rewinding tape to load point...

VOL1CAL501

4

Label Identifier: VOL1  
Volume Identifier: CAL501  
Volume Accessibility:  
Owner Identifier:  
Label Standard Version: 4

HDR1D001                    CAL50100010001000000 92183 00000 000000

Label Identifier: HDR1  
File Identifier: D001  
File Set Identifier: CAL501  
File Section Number: 0001  
File Sequence Number: 0001  
Generation Number: 0000  
Generation Version Number: 00  
Creation Date: 92183  
Expiration Date: 00000  
File Accessibility:  
Block Count: 000000  
Implementation Identifier:

HDR2D0204800260

00

Label Identifier: HDR2  
Recording Format: D  
Block Length: 02048  
Record Length: 00260  
Offset Length: 00

\*\*\*\*\* Tape Mark \*\*\*\*\*

Actual Block Size Found = 2048 Bytes.

Number of data blocks read = 1.

\*\*\*\*\* Tape Mark \*\*\*\*\*

EOF1D001                    CALS0100010001000000 92183 00000 000001

Label Identifier: EOF1  
File Identifier: D001  
File Set Identifier: CALS01  
File Section Number: 0001  
File Sequence Number: 0001  
Generation Number: 0000  
Generation Version Number: 00  
Creation Date: 92183  
Expiration Date: 00000  
File Accessibility:  
Block Count: 000001  
Implementation Identifier:

EOF2D0204800260

00

Label Identifier: EOF2  
Recording Format: D  
Block Length: 02048  
Record Length: 00260  
Offset Length: 00

\*\*\*\*\* Tape Mark \*\*\*\*\*

HDR1D001Q001                CALS0100010002000000 92183 00000 000000

Label Identifier: HDR1  
File Identifier: D001Q001  
File Set Identifier: CALS01  
File Section Number: 0001  
File Sequence Number: 0002  
Generation Number: 0000  
Generation Version Number: 00  
Creation Date: 92183  
Expiration Date: 00000  
File Accessibility:  
Block Count: 000000  
Implementation Identifier:

HDR2F0200000080

00

Label Identifier: HDR2  
Recording Format: F  
Block Length: 02000  
Record Length: 00080  
Offset Length: 00

\*\*\*\*\* Tape Mark \*\*\*\*\*

---

Actual Block Size Found = 2000 Bytes.

Number of data blocks read = 648.

\*\*\*\*\* Tape Mark \*\*\*\*\*

EOF1D001Q001            CALS0100010002000000 92183 00000 000648

Label Identifier: EOF1  
File Identifier: D001Q001  
File Set Identifier: CALS01  
File Section Number: 0001  
File Sequence Number: 0002  
Generation Number: 0000  
Generation Version Number: 00  
Creation Date: 92183  
Expiration Date: 00000  
File Accessibility:  
Block Count: 000648  
Implementation Identifier:

EOF2F02000000080

00

Label Identifier: EOF2  
Recording Format: F  
Block Length: 02000  
Record Length: 00080  
Offset Length: 00

\*\*\*\*\* Tape Mark \*\*\*\*\*

\*\*\*\*\* Tape Mark \*\*\*\*\*

##### End of Volume CALS01 #####

##### End Of Tape File Set #####

Rewinding tape to load point...

Tape Import Process terminated normally.



---

### 9.3 Tape File Set Validation Log

CALS Test Network File Set Evaluation - Version 1.2; Release Number 8

Standards referenced:

MIL-STD-1840A (1987) - Automated Interchange of Technical Information

Tue Jul 07 14:49:18 1992

MIL-STD-1840A File Set Evaluation Log

File Set: SET004

Found file: D001

Extracting Document Declaration Header Records...

Evaluating Document Declaration Header Records...

srcsys: Unigraphics II System in San Diego - IGES files

srcdocid: San Diego Unigraphics System

srcrelid: NONE

chglvl: ORIGINAL

dteisu: 19920701

dstsys: P/C Based CADKEY

dstdocid: CALS Test Network

dstrelid: NONE

dtetrn: 19920701

dlvacc: NONE

filcnt: Q1

ttlcls: UNCLASSIFIED

doccls: UNCLASSIFIED

doctyp: Product Data

doctl: NONE

Found file: D001Q001

Extracting IGES Header Records...

Evaluating IGES Header Records...

srcdocid: San Diego Unigraphics System

dstdocid: CALS Test Network

txtfilid: NONE

figid: NONE

srcgph: NONE

doccls: UNCLASSIFIED

notes: NONE

Saving IGES Header File: D001Q001.HDR

Saving IGES Data File: D001Q001.IGS

Evaluating numbering scheme...

No errors were encountered during numbering scheme evaluation.

Numbering scheme evaluation complete.

Checking file count...

No errors were encountered during file count verification.

File Count verification complete.

No errors were encountered in Document D001.

No errors were encountered in this File Set.

MIL-STD-1840A File Set Evaluation Complete.

## 10. Appendix A - IGES Detail Analysis

### 10.1 D001Q001

#### 10.1.1 Parser Log

```
*** IGES DATA FILE PARSING ***  
***      AUGUST 1991      ***  
***   IGES Data Analysis   ***  
***   (708) 449-3430      ***
```

Input file is \tapetool\set004\d001\d001q001.igs

Checking conformance to CALS Class II

Today is July 7, 1992 4:32 PM

\*\*\* Count of Records Per Section in Data File \*\*\*

Section	Records
Start	1
Global	4
Directory	6162 ( 3081 Entities).
Parameter	10014
Terminate	1

\*\*\* Start Section From Input File:

S 1

\*\*\* Global Section From Input File:

1H,,1H;,36H	paris:[native.dd.t-47]test_inlet.prt,14H	test_inlet.igs,37H	UniG	1
graphics II on VAX/VMS Version 8.0,21H	UGII/IGES version 8.0,32,38,16,38,G			2
16,24H	Sundstrand Power Systems,1.0,2,2H	M,3,,13H	920623.092354,0.1D-7,, G	3
14H	Bruce J. Brown,20H	Sundstrand Aerospace,6,0;	G	4

\*\*\* File and Product Name Information \*\*\*

```
File name from sender   = 'test_inlet.igs'  
File creation Date.Time = '920623.092354'  
* Model change Date.Time = ''  
Author                  = 'Bruce J. Brown'  
Department              = 'Sundstrand Aerospace'  
Product name from sender = 'paris:[native.dd.t-47]test_inlet.prt'  
Destination product name = 'Sundstrand Power Systems'
```

\*\*\* Parameter Delimiters \*\*\*

---

Delimiter = ','  
Terminator = ';'

\*\*\* Originating System Data \*\*\*

System ID = 'Unigraphics II on VAX/VMS Version 8.0'  
Preprocessor version = 'UGII/IGES version 8.0'  
Specification version = 6 (IGES 4.0)

\*\*\* Precision Levels \*\*\*

Integer bits = 32  
Floating point - Exponent = 38 Mantissa = 16  
Double precision - Exponent = 38 Mantissa = 16

\*\*\* Global Model Data \*\*\*

Model scale = 1.0000E+000  
Unit flag = 2  
Units = 'MM'  
Line weights = 3  
\* Maximum line thickness = 0.000000E+000  
ERROR 3009: CALS Class II does not allow maximum thickness to be defaulted.  
WARNING 1082: Maximum line thickness specified is zero.  
Minimum line thickness = 0.000000E+000  
CAUTION 1081: Maximum line thickness equal to minimum thickness.  
Granularity = 1.000000E-008  
\* Maximum coordinate = 0.000000E+000  
ERROR 3008: CALS Class II does not allow maximum coordinate to be defaulted.  
CAUTION 1080: Maximum coordinate value in data is to be zero.

Drafting standard applicable to original data is not specified.

\*\* 3 defaulted Global values.  
(\*) Indicates a defaulted value.

\*\*\*\*\*  
\*\*\* Entity Parsing Messages \*\*\*  
\*\*\*\*\*

\*\* 580 defaulted Parameter data values.

\*\*\* Message Summary \*\*\*

1019: 3 Invalid Global parameters.  
3001: 2 Illegally defaulted global values.

\*\*\* Error Summary \*\*\*

0 fatal errors  
0 severe errors  
2 errors

1 warnings  
2 cautions  
0 nitpicks  
0 notes

\*\*\* Completed Parsing of \tapetool\set004\d001\d001q001.igs \*\*\*

## 10.1.2 Verify Log

\*\*\* IGES DATA FILE ANALYSIS \*\*\*  
\*\*\* AUGUST 1991 \*\*\*  
\*\*\* IGES Data Analysis \*\*\*  
\*\*\* (708) 449-3430 \*\*\*

Input file is \tapetool\set004\d001\d001q001.igs

Checking for conformance to CALS Class II

Today is July 7, 1992 4:34 PM

\*\*\* File and Product Name Information \*\*\*

File name from sender = 'test\_inlet.igs'  
File creation Date.Time = '920623.092354'  
Model change Date.Time = ''  
Author = 'Bruce J. Brown'  
Department = 'Sundstrand Aerospace'  
Product name from sender = 'paris:[native.dd.t-47]test\_inlet.prt'  
Destination product name = 'Sundstrand Power Systems'

\*\*\* Parameter Delimiters \*\*\*

Delimiter = ','  
Terminator = ';'.

\*\*\* Originating System Data \*\*\*

System ID = 'Unigraphics II on VAX/VMS Version 8.0'  
Preprocessor version = 'UGII/IGES version 8.0'  
Specification version = 6 (IGES 4.0)

\*\*\* Precision levels \*\*\*

Integer bits = 32  
Floating point - Exponent = 38 Mantissa = 16  
Double precision - Exponent = 38 Mantissa = 16

\*\*\* Global Model Data \*\*\*

Model scale = 1.0000E+000

---

Unit flag = 2  
 Units = 'MM'  
 Line weights = 3  
 Maximum line thickness = 0.000000E+000  
 CAUTION 2318: Maximum line thickness specified is zero.  
 Minimum line thickness = 0.000000E+000  
 CAUTION 2317: Maximum line thickness equal to minimum thickness.  
 Granularity = 1.000000E-008  
 Maximum coordinate = 0.000000E+000  
 CAUTION 2316: Maximum coordinate value in data is to be zero.

Drafting standard applicable to original data is not specified.

\*\*\* Status Flag Summary \*\*\*

Blank status:	Visible	2825
	Blanked	256
Independence:	Independent	2643
	Physically Subordinate	161
	Logically Subordinate	277
	Totally Subordinate	0
Entity use:	Geometry	2289
	Annotation	714
	Definition	0
	Other	78
	Logical/Positional	0
	2D parametric	0
	Not Specified	0
Hierarchy:	Structure DE applies	0
	Subordinate DE applies	3081
	Hierarchy property applies	0
	Not Specified	0

\*\*\* Entity Occurrence Counts \*\*\*

Entity	Form	Level	Count	Type
-----	-----	-----	-----	-----
100	0	0	2	Circular arc
100	0	1	95	
100	0	42	250	
100	0	43	6	
100	0	44	128	
100	0	100	3	

---

100	0	102	1	
100	0	200	12	
106	31	1	48	Section lines - General use, iron, brick, stone ma
108	1	1	98	Plane, Bounded
110	0	1	1027	Line
110	0	2	5	
110	0	4	4	
110	0	5	15	
110	0	6	2	
110	0	7	9	
110	0	42	146	
110	0	44	173	
110	0	100	25	
110	0	102	34	
110	0	200	43	
112	0	1	14	Parametric spline curve
112	0	42	11	
112	0	44	40	
112	0	200	3	
118	1	200	1	Ruled surface (Equiparametric parametrization)
120	0	200	29	Surface of Revolution
124	0	1	88	Transformation matrix
212	0	1	561	General note
212	0	2	2	
212	0	4	3	
212	0	5	11	
212	0	6	2	
212	0	7	10	
212	0	102	27	
228	0	102	3	General symbol
402	3	1	8	Views visible instance
402	7	1	33	Group without back-pointers instance
404	0	262	7	Drawing
406	15	1	64	Property - Name
406	16	1	7	Property - Drawing size
406	17	1	7	Property - Drawing units
+ 406	6000	1	4	Implementor entity instance
410	0	262	20	View - Orthographic parallel

+ Indicates use of a Implementor defined form or entity.

\*\*\* Entity Count by Level \*\*\*

Level	Count
0	2
1	2054
2	7
4	7
5	26
6	4
7	19
42	407

---

43	6
44	341
100	28
102	65
200	88
262	27

\*\*\* Labeling Information \*\*\*

2% of the entities are labeled.

Unlabeled 3017

Label	Count	Label	Count	Label	Count
FIRST_NO	2	LAST_NOT	4	TEMP_DL_	31
TOP	1	FRONT	1	RIGHT	1
BACK	1	BOTTOM	1	LEFT	1
TFR-ISO	1	TFR-TRI	1	SHEET	7
SHEET-P/	1	NOTES	1	FRONT-VI	1
RHSIDE-V	1	SECTION-	1	DRAW-SH	2
D	5				

\*\*\* Line Fonts Used in Data \*\*\*

100 102 104 106 108 110 112 114

2	-	-	-	-	-	-	-	Undefined
480	-	-	48	98	1370	40	-	Solid
-	-	-	-	-	32	2	-	Dashed
14	-	-	-	-	75	26	-	Phantom
1	-	-	-	-	6	-	-	Center-line
-	-	-	-	-	-	-	-	Dotted
-	-	-	-	-	-	-	-	User defined

116 118 120 122 124 125 126 128

-	-	-	-	-	-	-	-	Undefined
-	1	29	-	88	-	-	-	Solid
-	-	-	-	-	-	-	-	Dashed
-	-	-	-	-	-	-	-	Phantom
-	-	-	-	-	-	-	-	Center-line
-	-	-	-	-	-	-	-	Dotted
-	-	-	-	-	-	-	-	User defined

130 132 134 136 138 140 142 144

-	-	-	-	-	-	-	-	Undefined
-	-	-	-	-	-	-	-	Solid
-	-	-	-	-	-	-	-	Dashed
-	-	-	-	-	-	-	-	Phantom



---

-	-	-	-	-	-	-	-	Center-line
-	-	-	-	-	-	-	-	Dotted
-	-	-	-	-	-	-	-	User defined

\*\*\* Line Widths Used in Data \*\*\*

Weight	Count	Width
Defaulted	0	(0.0000)
2	2160	(0.0000)
1	462	(0.0000)
3	459	(0.0000)

\*\*\* Colors Used in Data \*\*\*

Defaulted	336
Green	94
Blue	404
Yellow	2001
Cyan	72
White	174

\*\*\*\*\*  
\*\*\*\*\* ENTITY ANALYSIS \*\*\*\*\*  
\*\*\*\*\*

\*\*\* Entity type: 100

\*\*\* Entity type: 106

CAUTION 2331: Use of section lines (Form 31-38) at D 4367 is not recommended.  
CAUTION 2331: Use of section lines (Form 31-38) at D 4369 is not recommended.  
CAUTION 2331: Messages suppressed

\*\*\* Entity type: 108

ERROR 2012: Bounded Plane defined at D 5805 without a boundary specified.  
ERROR 2012: Bounded Plane defined at D 5807 without a boundary specified.  
ERROR 2012: Messages regarding bounded plane without boundary suppressed.

\*\*\* Entity type: 110

-- 1483 lines averaging 1.002280E+002 units --

\*\*\* Entity type: 112

\*\*\* Entity type: 118

\*\*\* Entity type: 120

\*\*\* Entity type: 124

88 transformation matrices, 0 non-zero translations.

\*\*\* Entity type: 212

ERROR 2279: Text box width is negative or zero at D 4477.  
ERROR 2278: Text box height is negative or zero at D 4477.  
ERROR 2279: Text box width is negative or zero at D 5127.  
ERROR 2278: Text box height is negative or zero at D 5127.  
Message Suppressed

676 text strings in data file.  
Average text aspect ratio in file is 1.0305234.  
Minimum text aspect ratio in file is 0.5684211.  
Maximum text aspect ratio in file is 1.2923611.

FONTS USED IN FILE

FONT	COUNT	NAME
1	676	Default ASCII Style
1003	9	Drafting Font

\*\*\* Entity type: 228

WARNING 2323: No geometry referenced by general symbol at D 5585.  
WARNING 2323: No geometry referenced by general symbol at D 5633.  
WARNING 2323: No geometry referenced by general symbol at D 5675.

\*\*\* Entity type: 402

ERROR 4042: Illegal form for CALS Class II specified at D 5677.  
ERROR 4042: Illegal form for CALS Class II specified at D 5681.  
ERROR 4042: Messages regarding form numbers suppressed.

\*\*\* Entity type: 404

Drawing at D 6097 contains 4 views.  
Drawing at D 6097 contains 0 annotation entities.  
Drawing at D 6105 contains 2 views.  
Drawing at D 6105 contains 0 annotation entities.  
Drawing at D 6113 contains 1 views.  
Drawing at D 6113 contains 0 annotation entities.  
Drawing at D 6121 contains 1 views.  
Drawing at D 6121 contains 0 annotation entities.  
Drawing at D 6129 contains 1 views.  
Drawing at D 6129 contains 0 annotation entities.  
Drawing at D 6137 contains 1 views.  
Drawing at D 6137 contains 0 annotation entities.  
Drawing at D 6145 contains 1 views.

Drawing at D 6145 contains 0 annotation entities.

\*\*\* Entity type: 406

Independent property at D 5595 applies to level 1.  
Independent property at D 5601 applies to level 1.  
Independent property at D 5607 applies to level 1.  
Independent property at D 5613 applies to level 1.

\*\*\* Entity type: 410

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5817.  
Scale of view at D 5817 is 1.000000E+000.

Orthographic View entity at D 5817 has 6 clipping planes specified.

XMIN = -145.524	XMAX = 147.574
YMIN = -128.743	YMAX = 242.184
ZMIN = -153.763	ZMAX = 154.763

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5835.  
Scale of view at D 5835 is 1.000000E+000.

Orthographic View entity at D 5835 has 6 clipping planes specified.

XMIN = -145.524	XMAX = 147.574
YMIN = -184.963	YMAX = 185.963
ZMIN = -163.005	ZMAX = 49.564

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5853.  
Scale of view at D 5853 is 1.000000E+000.

Orthographic View entity at D 5853 has 6 clipping planes specified.

XMIN = -65.175	XMAX = 178.616
YMIN = -153.763	YMAX = 154.763
ZMIN = -145.524	ZMAX = 147.574

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5865.  
Scale of view at D 5865 is 1.000000E+000.

Orthographic View entity at D 5865 has 4 clipping planes specified.

XMIN = -149.231	XMAX = 13.991
YMIN = -146.575	YMAX = 146.575
ZMIN = Not Set	ZMAX = Not Set

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5877.  
Scale of view at D 5877 is 1.000000E+000.

Orthographic View entity at D 5877 has 4 clipping planes specified.

XMIN = -13.991	XMAX = 149.231
YMIN = -146.575	YMAX = 146.575
ZMIN = Not Set	ZMAX = Not Set

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5895.  
Scale of view at D 5895 is 1.000000E+000.

Orthographic View entity at D 5895 has 6 clipping planes specified.

XMIN = -178.616	XMAX = 65.175
YMIN = -153.763	YMAX = 154.763
ZMIN = -147.574	ZMAX = 145.524

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5913.

Scale of view at D 5913 is 1.000000E+000.

Orthographic View entity at D 5913 has 6 clipping planes specified.

XMIN = -78.931 XMAX = 210.035  
YMIN = -121.631 YMAX = 244.064  
ZMIN = -254.926 ZMAX = 104.601

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 5931.

Scale of view at D 5931 is 1.000000E+000.

Orthographic View entity at D 5931 has 6 clipping planes specified.

XMIN = -145.907 XMAX = 280.548  
YMIN = -144.367 YMAX = 215.429  
ZMIN = -247.354 ZMAX = 100.576

Scale of view at D 5943 is 1.000000E+000.

Orthographic View entity at D 5943 has 4 clipping planes specified.

XMIN = -14.059 XMAX = 1138.816  
YMIN = -54.547 YMAX = 918.121  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 5955 is 1.000000E+000.

Orthographic View entity at D 5955 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 5967 is 1.000000E+000.

Orthographic View entity at D 5967 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 5979 is 1.000000E+000.

Orthographic View entity at D 5979 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 5991 is 1.000000E+000.

Orthographic View entity at D 5991 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 6003 is 1.000000E+000.

Orthographic View entity at D 6003 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 6015 is 1.000000E+000.

Orthographic View entity at D 6015 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

CAUTION 2332: View attributes are not subordinate (orphan view?) at D 6027.

Scale of view at D 6027 is 1.000000E+000.

Orthographic View entity at D 6027 has 4 clipping planes specified.

XMIN = -13.970 XMAX = 1131.570  
YMIN = -51.440 YMAX = 915.040  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 6039 is 1.000000E+000.

Orthographic View entity at D 6039 has 4 clipping planes specified.

XMIN = -186.623 XMAX = 363.764  
YMIN = 338.003 YMAX = 802.359  
ZMIN = Not Set ZMAX = Not Set

Scale of view at D 6055 is 1.000000E+000.

Orthographic View entity at D 6055 has 6 clipping planes specified.

XMIN = -364.661 XMAX = 366.711  
YMIN = -153.763 YMAX = 154.763  
ZMIN = -163.005 ZMAX = 49.564

Scale of view at D 6071 is 1.000000E+000.

Orthographic View entity at D 6071 has 6 clipping planes specified.

XMIN = -126.122 XMAX = 239.563  
YMIN = -153.763 YMAX = 154.763  
ZMIN = -126.375 ZMAX = 147.338

Scale of view at D 6087 is 2.000000E+000.

Orthographic View entity at D 6087 has 6 clipping planes specified.

XMIN = -126.122 XMAX = 239.563  
YMIN = -153.763 YMAX = 154.763  
ZMIN = -66.950 ZMAX = 66.950

\*\*\* Message Summary \*\*\*

2006: 98 Missing pointers.

2009: 3 Illegal defaults.

2012: 18 Inconsistent data for entity definition.

2018: 2 Problems with line weight/width display information.

4019: 37 Entities with illegal form

\*\*\* Error Summary \*\*\*

0 fatal errors

0 severe errors

153 errors

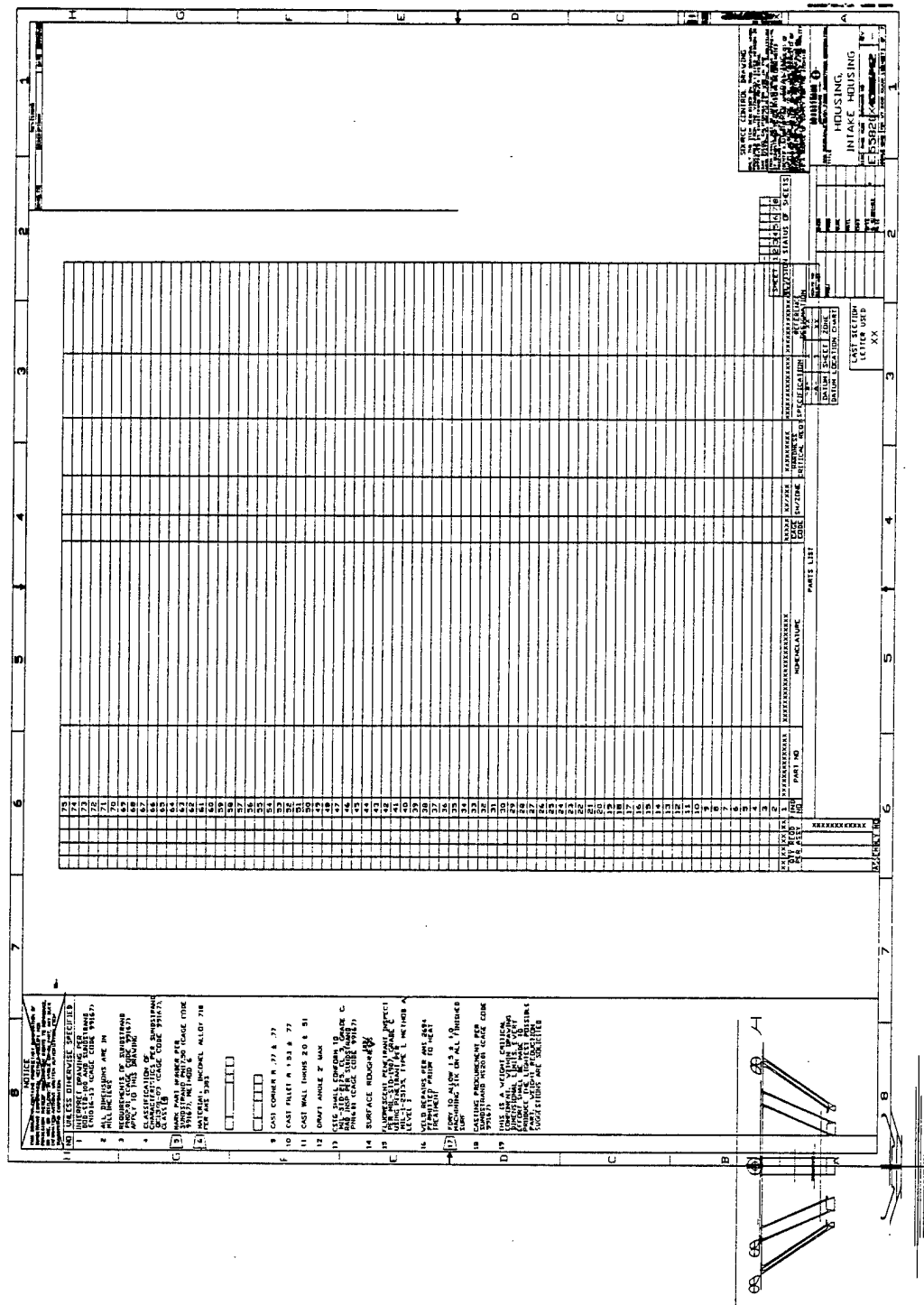
3 warnings

60 cautions

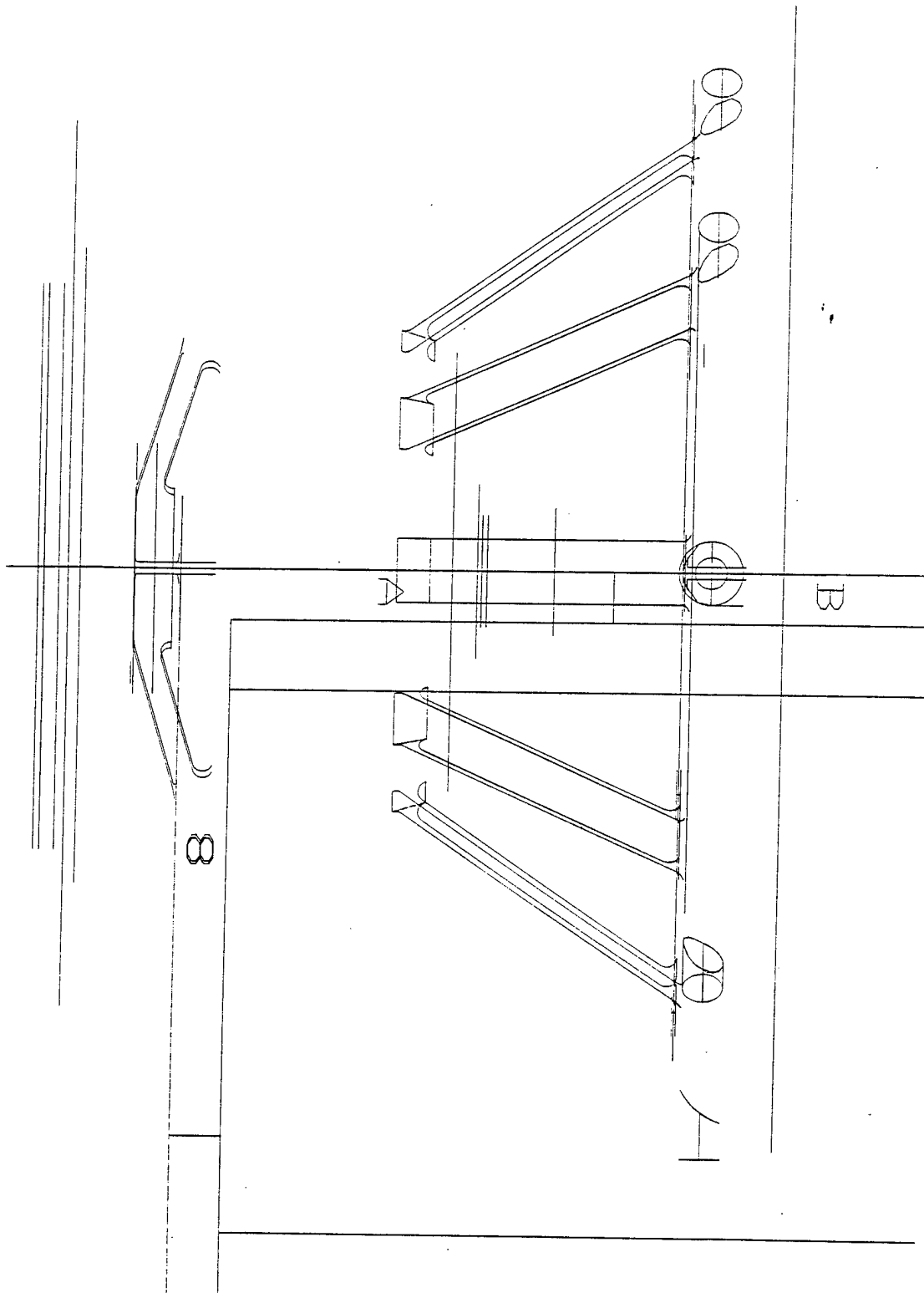
0 nitpicks  
0 notes

\*\*\* End of Analysis of \tapetool\set004\d001\d001q001.igs \*\*\*

## 10.1.3 Output AutoCAD R11 - Complete Drawing

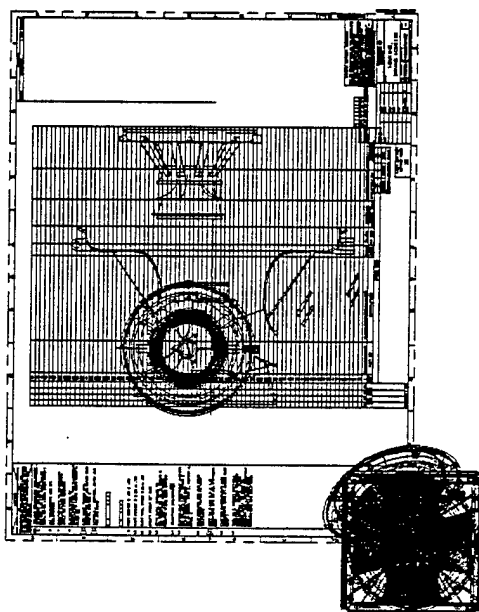


## 10.1.4 Output AutoCAD R11 - Part Detail

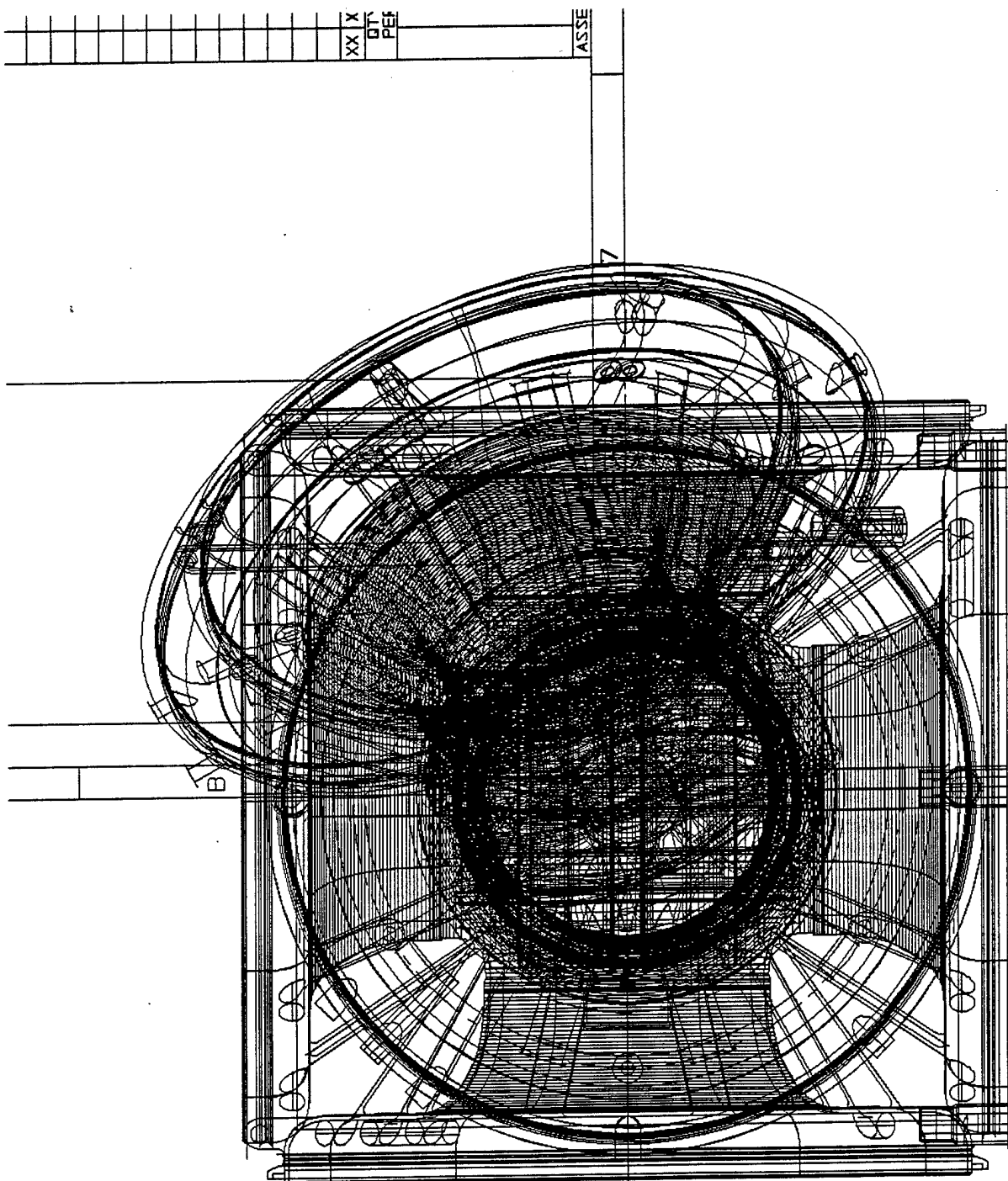




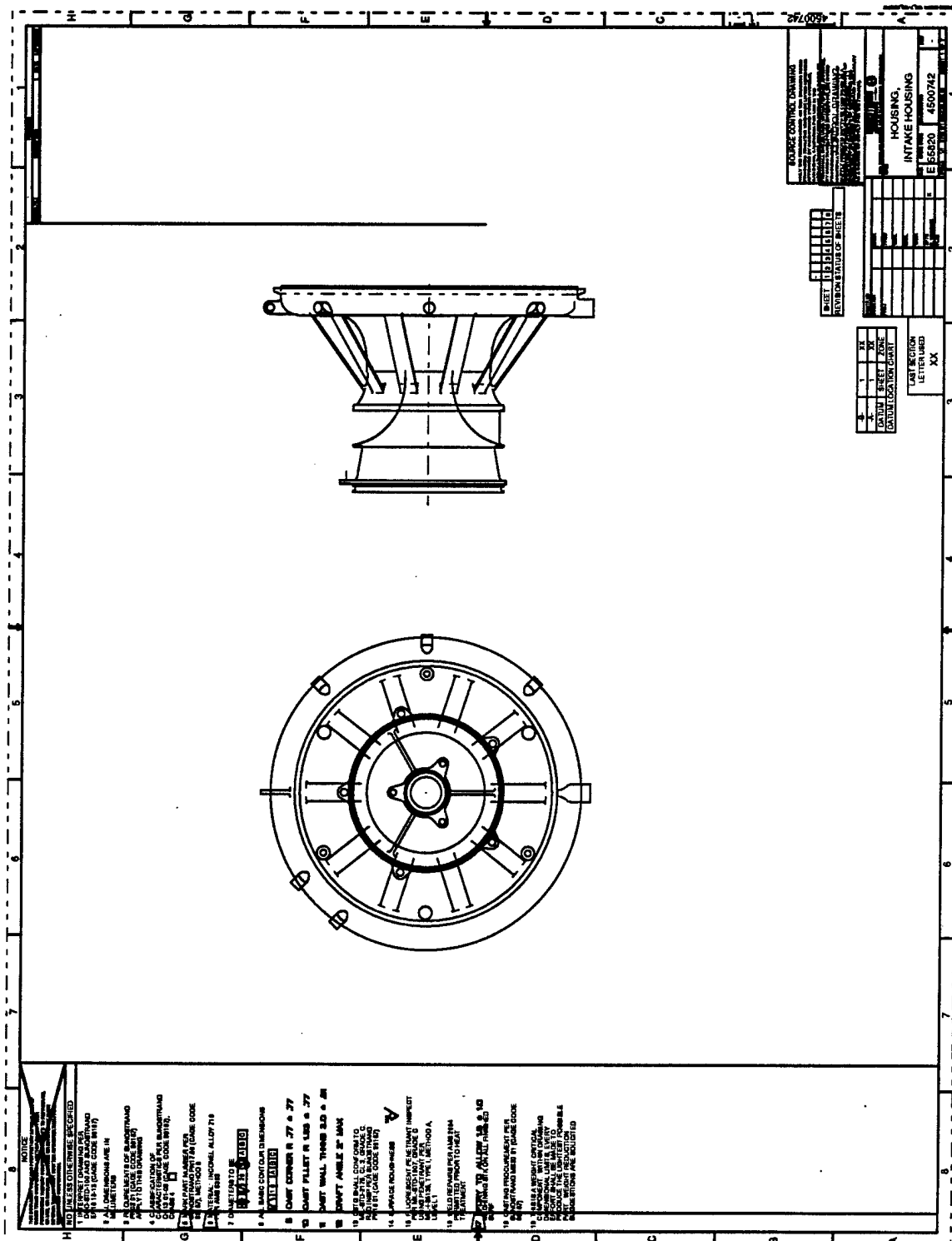
## 10.1.5 Output Cadkey v4.06 - Complete Drawing



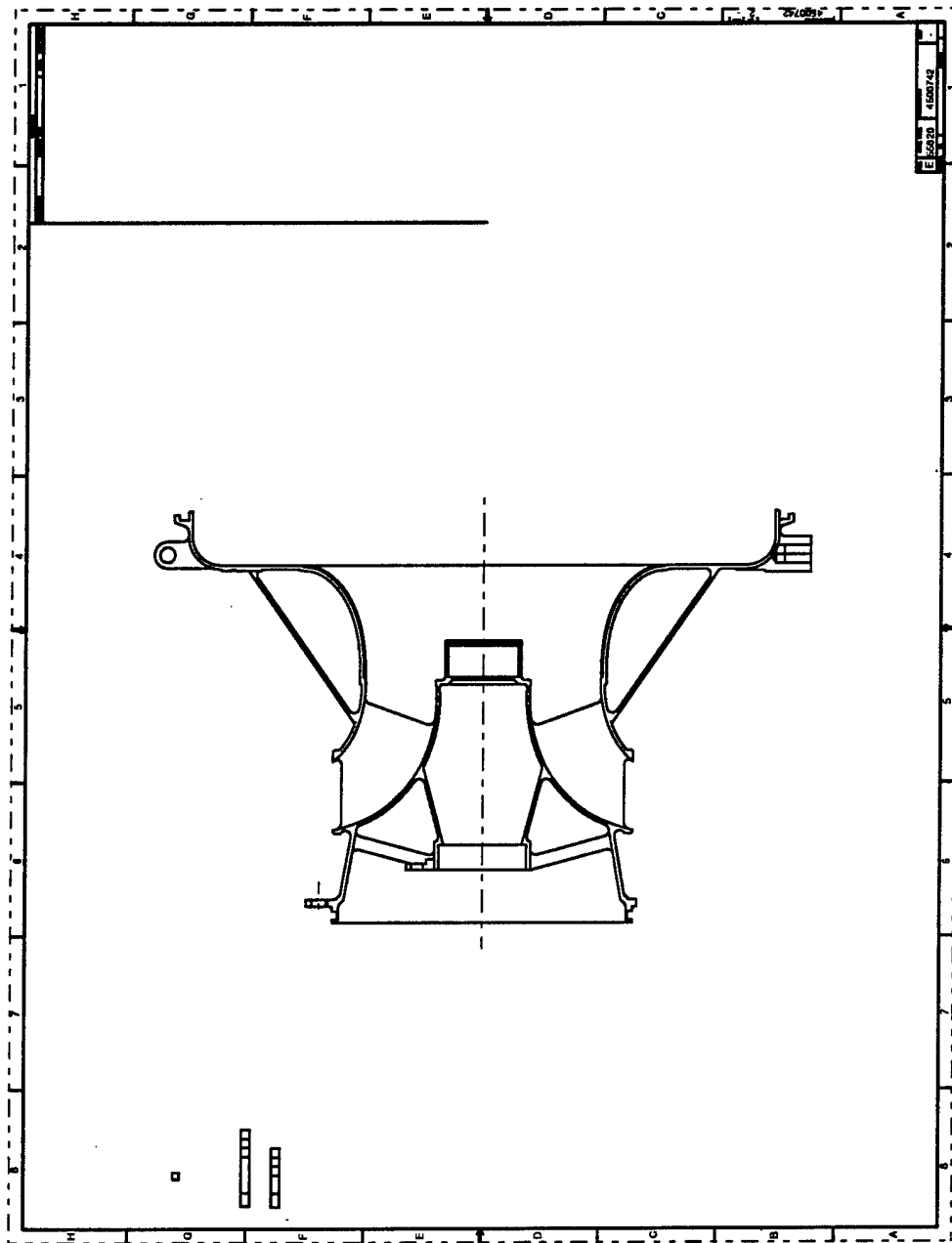
## 10.1.6 Output Cadkey v4.06 - Part Detail



## 10.1.7 Output IGESView - Drawing One



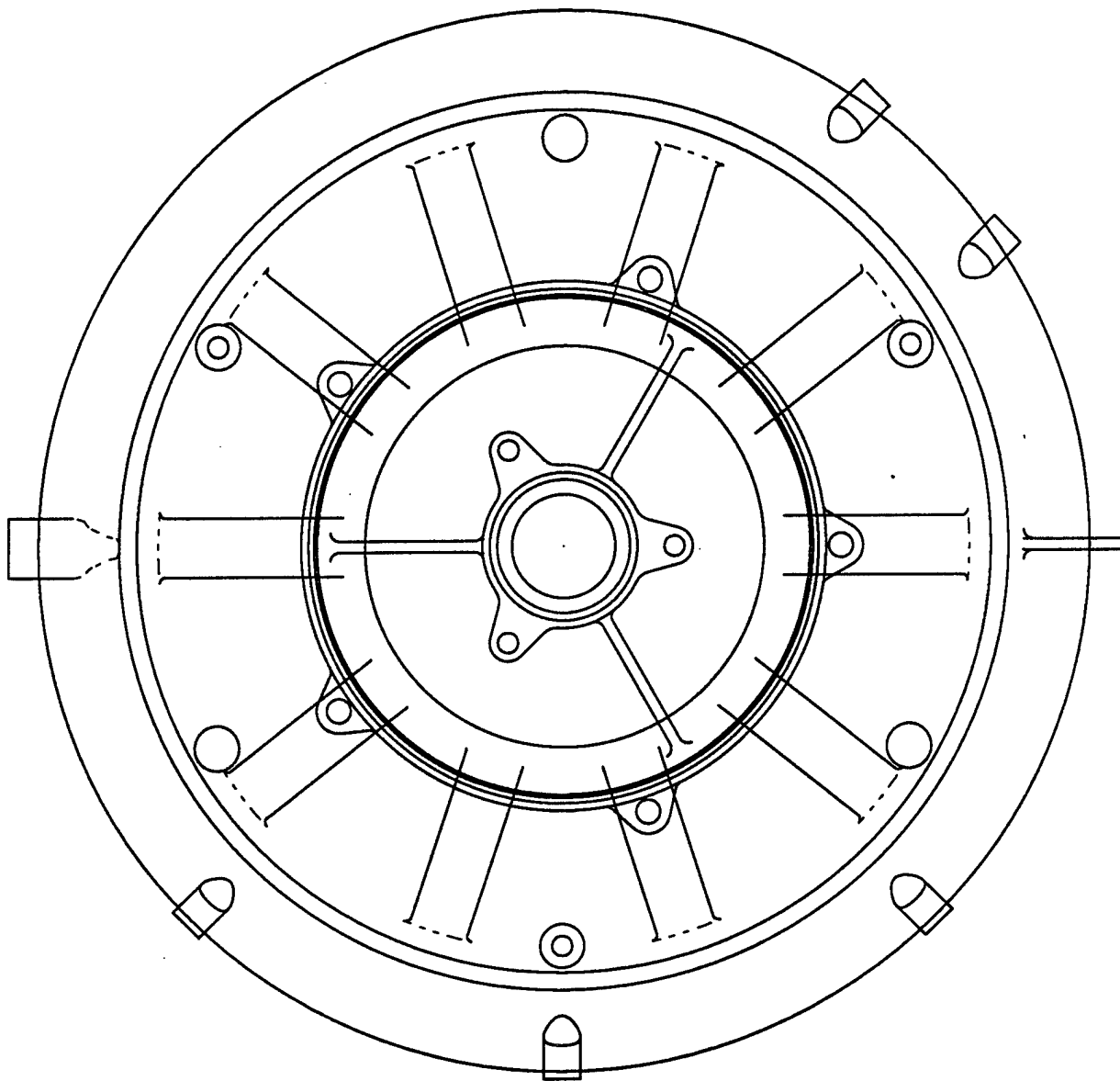
## 10.1.8 Output IGESView - Drawing Two



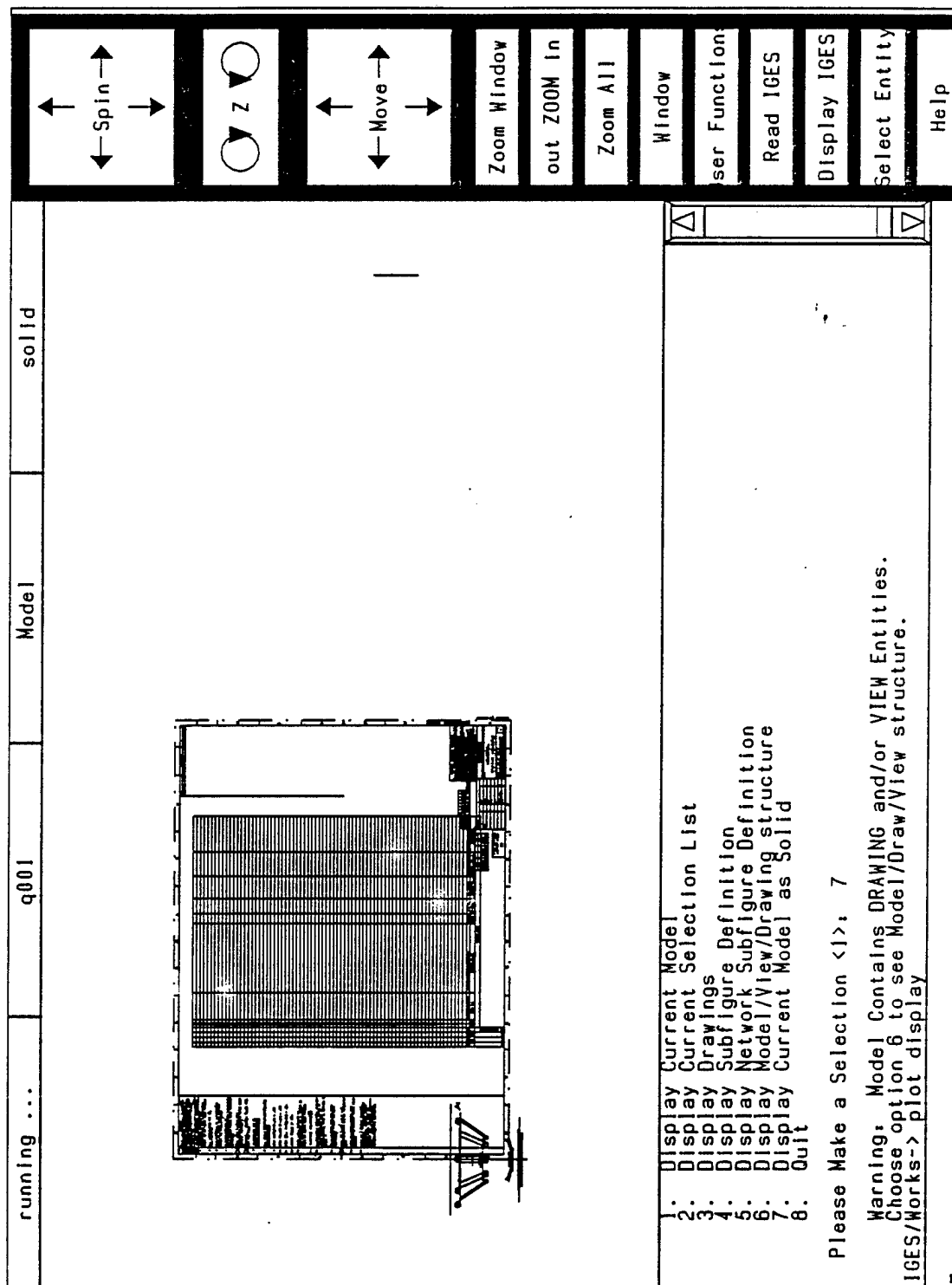
### 10.1.9 Output IGESView - Sheet P/L

[illegible]

## 10.1.10 Output IGESView - Front View



## 10.1.11 Output IGESWorks - Complete Drawing



Technical drawing of a Housing, Intake Housing, showing a top view and a side view. The top view is a circular flange with 12 radial ribs and 12 bolt holes. The side view shows a conical shape with a flange at the top and a base. The drawing is labeled 'HOUSING, INTAKE HOUSING' and '4500742'.





## 10.1.14 Output Preview - Drawing 2

